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Agricultural Engineering.

Engineering aspects of farm planning. By W. E. Hudson. Agricultural engineering. v.21,no.6. June, 1940. p.214,218. Purpose of farm planning is to put farm business on more self-sufficient basis, and at same time conserve and build up resources of particular farm. Food needs of family and livestock are foundation of plan. Upon this foundation is built system of farming which tends to balance soil-depleting crops with soil-conserving crops, which replaces soil fertility losses with soil fertility gains, and which offsets hazardous gamble of single-crop farming with cautious but ever-broadening diversification of enterprises. Through proper planning, real farm income should increase first, with net cash increases following closely.

National defense, agricultural engineering, and farm chemurgy. By Wheeler McMillen. Agricultural engineering. v.21,no.7. July, 1940. p.257-258. Whatever outcome of current struggles, whether Hitler threatens the western hemisphere or not, we in this country are going to have to establish defenses for American standard of living. Instrument required for this purpose is unleashed production of materials and goods which Americans consume. Production creates earning power, and earning power is basis of standard of living. Standards of living can not be advanced without a dynamic production machine ever moving on enlarging paths. A shrunken production will either produce or perpetuate depression. Those of us who have urged farm chemurgic program have believed that by establishing new crops to supply materials now needed and consumed in America, by developing new uses for farm products, by finding markets for agricultural wastes, profitable output of agriculture could be increased. You in the fields of agricultural engineering have worked to reduce costs of production, and to improve not only productive efficiency but ability of producers to enjoy fruits of their work. Thus chemurgy and agricultural engineering operate hand in hand for the military and civilian defense of our country, and for defense of our standards of living.

Agriculture.

Engineering factors in a balanced agriculture. By K. J. T. Ekblaw. Agricultural engineering. v.21,no.4. April, 1940. p.127-128. Improvement needed in farm structures. Power equipment is making rapid advances. Engineers must assume general responsibility. New solutions needed for old problems.

Proceedings, abstracts of papers and addresses of the 41st annual convention of the Association of southern agricultural workers, held in Birmingham, Ala. February 7,8,9, 1940. n.p. 229p.

Air Conditioning.

Research develops better air conditioning. By William B. Henderson. Ice and refrigeration. v.98,no.6. June, 1940. p.451-452.

Symposium considers drying of air. Chemical and metallurgical engineering. v.47,no.4. April, 1940. p.228-229. Use of absorptive solutions, silica gel and activated alumina, are subjects considered.

Animals, Effect of Temperature on.

Reactions of animals to environmental temperature, humidity, and air movement. By Samuel Brody. Agricultural engineering. v.21,no.7. July, 1940. p.265-268. Summary of basic facts relating to reactions of animals to their environment. 1. There is minimum energy cost to being alive which is measured by heat production or heat dissipation, which is called "basal metabolism". In addition to this basal metabolism there are heat-production increases going under names of "supermetabolism" or "heat increments" above basal level. 2. Heat produced must be dissipated at such a rate as to keep body temperature constant. 3. Thermoneutrality is an environmental temperature at which animal does not have to employ any of its thermoregulatory devices to keep its body temperature constant. 4. At temperatures below thermoneutrality animal keeps warm first by physical methods, not involving increase in heat production, then, as temperature declines, by chemical methods involving increased heat production. 5. At temperatures below thermoneutrality, heat dissipation is mostly (up to about 70 per cent) by radiation of infrared waves. 6. At temperatures above thermoneutrality (above about 85F) burden of heat dissipation is rapidly shifted from radiation and convection to vaporization. 7. Reaction of animals to hot environment depends mainly on their ability to sweat, and on conditions which affect vaporization, namely, humidity and air movement.

Appraisals.

Farm appraisals. Agricultural engineering. v.21,no.6. June, 1940. p.227-228,234. Report is intended to show (1) human need and increasing demand for sound and dependable farm appraisals, (2) want of more basic appraisal knowledge, and (3) need for men in appraisal profession who are technically trained, have conservative judgment, and are willing to serve in accordance with high ethical standards.

Boilers.

Operating characteristics of electric steam boilers. By J. R. Tavernetti and K. F. McIntire. Agricultural engineering. v.21,no.4. April, 1940. p.141-143. Conclusions: 1. In selecting boiler from six tested on basis of two sterilizing periods per day, consideration of other factors such as convenience, electric rates and initial cost is more important than energy consumption. 2. In selecting boiler on basis of one sterilizing period per day, instantaneous type has definite advantage in energy consumption. 3. Efficiency of accumulator boilers could be improved only by increasing their insulation. 4. Efficiency of instantaneous boilers could be improved both by increasing insulation and by reducing amount of heat left in boiler after sterilizing operations are finished.

Building Construction.

Training builders. By C. T. Bridgman. Agricultural engineering. v.21,no.6. June, 1940. p.210. Iowa State College has enrolled 34 bricklayer apprentices in course which consists of half-time actual experience and half-time studying related technical subjects. This short-course was made possible by cooperation of three organizations active in building industry: Master Builders Association of Iowa, Structural Clay Products Institute (Region 1-W), and Bricklayers, Masons and Plasterers International Union.

Building Materials.

Engineering research: committee on the deterioration of structures in sea-water. Journal of the institution of civil engineers. v.14,no.7. June, 1940. p.383-391. Summary of experiments carried out by the Committee on the Deterioration of Structures of timber, metal, and concrete exposed to the action of sea-water.

Sawdust-concrete investigations. By L. W. Neubauer. St. Paul, Minn., 1940. 1p. University of Minnesota. Agricultural extension division. Agricultural engineering news letter no.98.

Sulphate resistance of 94 commercial cements. By Philip W. Manson. Agricultural engineering. v.21,no.4. April, 1940. p.135-137. Report discusses certain promising results of

Building Materials. (Cont'd).

investigations, relative to prevention of failure, that have been developed during past six years. It deals with tests carried out on series of concrete cylinders identically made except for brand of cement used. In this investigation 94 different commercial brands of portland cement were used and subjected to comparable treatments and observations.

Chemistry, Technical.

Engineering aspects of handling farm chemurgic crops. By H. E. Barnard. Agricultural engineering. v.21,no.3. March, 1940. p.110-112. Lowering of farm costs important. Farm operations and costs influence processing problems. Domestic production of organic oils and fats. Opportunity for lowering costs in castor bean production.

Crops. (Drying).

Grass drying for livestock--low temperature treatment. By J. H. Brier. Modern refrigeration. v.43,no.506. May, 1940. p.104. Advantages of vacuum drying: Heat at 100° F. is sufficient; little or no change in chemical constituents, food values, texture or colour should take place; much less fuel is required; much higher heating efficiencies are obtained; because heat is lower losses are also lower; plant has great flexibility to meet peak demands; less time is required to raise sufficient heat and start drying. Since drying is done in enclosed vessel, there is no circulation of air, and entire power necessary to drive fans is thus saved. Destructive action of blast of hot air is avoided, while fragile tips are preserved intact, and dry product contains minimum percentage of dust. Products of combustion do not come in contact with grass, and thus tarry smoke, sulphur, carbon monoxide, carbonic acid gas, nitrous oxide, and other objectionable by-products are now kept away from grass.

Dairying.

Publications relating to the dairy industry. Washington, U.S. Bureau of dairy industry, 1939. 10p.mimeographed.

Drainage.

Drainage investigations of the farm credit administration. By Don H. Bushnell. Agricultural engineering. v.21,no.3. March, 1940. p.107-109.

Principles of tile drainage. By John R. Haswell. Agricultural engineering. v.21,no.8. August, 1940. p.310,316. Paper deals with random drainage where each foot of tile is laid to secure maximum returns.

Electric Wiring.

Farm wiring and rewiring promotion. By Hobart Beresford. Rural electrification exchange. v.3,no.3(New series). Third quarter, 1940. p.56-58.

Electricity - Distribution.

Organization, personnel, plan, and accomplishments for rural load development. By C. W. Cheatham. Rural electrification exchange. v.3,no.2(New series). 2d quarter, 1940. p.41-44.

Why are there unserved customers within one-half mile of rural lines? By L. L. Koontz. Rural electrification exchange. v.3,no.3(New series). Third quarter, 1940. p.60-61.

Electricity on the Farm.

Complete electrification in relation to farm income. By H. N. Stapleton. Agricultural engineering. v.21,no.7. July, 1940. p.264,274. Measures of farm income. Extensive use required to justify high equipment investment. Outlook toward more complete electrification. Wiring for increased use of electricity.

Electric barn cleaner. By L. C. Hoffman. Rural electrification exchange. v.3,no.2(New series). 2d quarter, 1940. p.47. Electric barn cleaner not only makes cleaning barn comparatively easy chore, but does far better and more thorough job than shovel and pitchfork method. One horsepower electric motor as rule is large enough to operate this equipment. Power required will vary with length of barn and quantity of manure loaded on conveyor.

Electric field cultivator. By J. C. Scott. Rural electrification exchange. v.3,no.2(New series). 2d quarter,1940. p.40. Gives diagram of electric field cultivator developed by Agricultural Engineering Department, Puget Sound Power & Light Company, June 1939.

Electricity and the plant growing industry. By E. J. Gildehaus. Rural electrification exchange. v.3,no.2(New series). 2d quarter, 1940. p.25-27,48. Artificial lights for greenhouses. Soil heating. Coal stokers and water systems. Spray equipment and insect traps. Soil treatment. Frost protection.

Electrified quail farm. By J. S. Hamilton. Rural electrification exchange. v.3,no.3(New series). 3d quarter, 1940. p.49-52,71.

Electricity on the Farm. (Cont'd).

Farmers increase use of electricity. By W. R. Newmyer. Rural electrification exchange. v.3,no.3(New series). 3d quarter, 1940. p.55,62.

Erosion.

Erosional topography and erosion; mathematical treatment with application to geomorphology, soil science, agronomy and engineering. By J. M. Little. San Francisco, Calif., A. Carlisle and co., 1940. 104p. Lithotone-printed.

Farm Buildings.

Approach to the farm buildings problem. By K. K. King. Agricultural engineering. v.21,no.3. March, 1940. p.90.

Farm Machinery and Equipment.

Economics of farm machinery. By John Lee Coulter. Agricultural engineering. v.21,no.7. July, 1940. p.259-263. Modern civilization awaited development of farm machinery to relieve important elements in population from primitive tasks of producing requirements of subsistence, and one might almost say that all modern progress dates from work of agricultural engineer.

Equipment for single seed planting. By S. W. McBirney. Southern Pacific rural press. v.139,no.6. March 23, 1940. p.204.

Farm machinery design--a critical appreciation of American methods. By Wm. Vutz. Agricultural engineering. v.21,no.8. August, 1940. p.303-305.

Farmer orders more machines. By F. Hal Higgins. Southern Pacific rural press. v.139,no.6. March 23, 1940. p.198,207.

Labour saving devices. By A. W. Bourne. Agricultural gazette of New South Wales. v.51,pt.4. April 1, 1940. p.193-194. Devices described have been in use at Grafton Experiment Farm for several years and have proved very satisfactory.

Mechanization of a Southern Plantation. By H. H. Hopson, Jr. and Wm. E. Meek. Agricultural engineering. v.21,no.6. June, 1940. p.211-213,217.

Social job of machinery. By H. B. Walker. Southern Pacific rural press. v.139,no.6. March 23, 1940. p.223.

Farm Machinery and Equipment. (Cont'd).

Some aspects of mechanization in American economy. By Harry G. Davis. Agricultural engineering. v.21,no.3. March, 1940. p.93-94. Basis of material welfare. Mechanization and industrial America. Increased effectiveness of farm work. Future opportunities in mechanization.

Various wheats tried for combine harvesting. In Progress of agricultural research in Ohio, 1937-1938. Wooster, Ohio, 1939. p.64-66. Ohio agricultural experiment station. Bulletin no.600.

Farmhouses.

Farm house and the architect. By Fred M. Overby. Agricultural engineering. v.21,no.3. March, 1940. p.103-104. Architectural considerations of stock plans. One-story farm houses. Time-saving lumber. Factors delaying farm home improvements.

Feed Grinders and Grinding.

Performance of small hammer mills. By John E. Nicholas. Agricultural engineering. v.21,no.6. June, 1940. p.207-210. Paper No.949 in Journal Series of Pennsylvania Agricultural Experiment Station.

Fences.

Construction of fence ends and corners. By Henry Giese and Maxton D. Strong. Agricultural engineering. v.21,no.4. April, 1940. p.131-134. Conclusions drawn from this study are as follows: 1. Total load on fence end varies with stretch and may be increased 50 per cent or more with temperature conditions. 2. Vertical component of load on end post of unanchored construction is decreased by increasing length of span, and length of span is most important factor affecting holding power of single-span assembly. 3. Inclining brace post of horizontal brace arrangement increased holding power very materially in tests on models, but caused no appreciable change in field tests. 4. Crossed-brace assemblies showed tendency to rise out of ground instantaneously, while horizontal arrangements pulled out more slowly. 5. Anchoring both horizontal and crossed-brace arrangements increased holding power. 6. Corner or end posts should be set at least 3 ft 6 in. 7. Setting posts in holes bored accurately to size increases holding power, but also increases difficulty in aligning. 8. All tests show double-span end assembly superior to single span, with less vertical and horizontal movement of end post. 9. Double-span corners held more than 200 per cent of load of any single-span corner, with 50 per cent or less of horizontal movement. 10. Single-span corners carried from 60 to 70 per cent as much load on each span as did single-span end.

Fences. (Cont'd).

11. Single-span corners failed almost entirely from vertical uplift, while ends had failed largely from combination of horizontal and vertical movement. 12. Sizes of members for most economical design recommended from these tests of 16-ft 6-in double-span end structure are as follows:

End post	Diameter, in	5	Length, ft	8
Middle post	" "	4	" "	8
End brace post	" "	3-1/2	" "	8
First compression brace	" "	4	" "	8
Second compression brace	" "	3-1/2	" "	8
Tension members	Two double strands of No.9 wire			

Fencing the farm. By L. R. Neel. Southern agriculturist. v.70,no.5. May, 1940. p.8.

Fire Protection.

Fire prevention on farms and in rural communities. By David J. Price. National fire protection association. Proceedings. v.34,no.1,Pt.2. July, 1940,quarterly. p.259-261.

Floors.

Suitability of No.2 Douglas Fir dimension for floor joists. By Henry Giese. Agricultural engineering. v.21,no.8. August, 1940. p.313-316. Table 1. Ultimate fiber stresses and character of failure. Table 2. Deflection of beams (second series).

Food.

World food supply; Partial list of references, 1925-1939. Compiled by M. T. Olcott. Washington, D.C., 1939. 164p. Mimeographed. U.S. Bureau of agricultural economics. Agricultural economics bibliography no.82.

Forage Crops.

Effect of sulfur dioxide on the nutritive value of alfalfa hay. By J. K. Loosli and others. Ithaca, N.Y., 1939. 39p. Cornell university. Agricultural experiment station. Memoir 227.

Grain Storage.

Results of research in corn storage. By H. J. Barre. Agricultural engineering. v.21,no.6. June, 1940. p.219-222. Paper discusses some phases of storage of both ear and shelled corn, particularly as to structural and ventilation requirements. Some findings of recent corn storage investigations, and brief discussion of problems needing further study are also included.

Heat Transmission.

Estimating heat flow through sunlit walls. By C. O. Mackey and L. T. Wright, Jr. Heating and ventilating. v.37,no.5. May, 1940. p.23-26. Part 3. Practical applications. Presents tables which may be readily and simply applied to practical problems involving typical constructions.

Houses.

Low-cost housing research. Mechanical engineering. v.62,no.7. July, 1940. p.553-554. In answer to demand for modern, low-cost housing, John B. Pierce Foundation, nonprofit research organization dedicated to betterment of human living, has just completed five-room, experimental house in Lebanon, N.J., at cost of $2632, including built-in furniture but excluding land and builder's overhead and profit. Only technical details of Foundation's house covered in this abstract.

Hydrology.

Daily and hourly precipitation; hydrologic network. Region 7: Southwest, January 1940. Albuquerque, N.M., U.S. Weather Bureau, Hydrologic unit, 1940. Unnumbered paging. Processed.

Deficiencies in hydrologic research; report of the Special advisory committee on hydrologic data. By the National resources planning board. Washington, U.S. Govt.print.off., 1940. 93p. Bibliography:p.89-92.

Hydrology of the Yangtze River. By Herbert Chatley. Institution of civil engineers. Journal. v.14,no.6. April, 1940. p.227-234.

Instruments for hydrologic research. By W. H. Pomerene. Agricultural engineering. v.21,no.3. March, 1940. p.102. Tachometer. Current velocity indicator. Azimuth meter. Telemetering.

Techniques of hydrologic research. By H. S. Riesbol. Agricultural engineering. v.21,no.7. July, 1940. p.269-273. Summary: Critical review of techniques utilized in hydrologic research leads to certain specific conclusions and suggestions: (1) Methods for measuring activity of hydrologic processes on areal basis have not advanced to equal degree of ability for all processes. Rainfall and runoff, for example, can be measured much more accurately over large area than can soil moisture or transpiration. (2) In many cases techniques now available do not provide for tracing dynamic activities of any process throughout its occurrence or for correlating such activities with biotic influences of soils and cover. (3) Many workers are now engaged in developing methods and procedures which

Hydrology. (Cont'd).

will eventually overcome shortcomings mentioned in (1) and (2). It is hope of every hydrologist that such development will lead as rapidly as possible to additional techniques which will permit complete quantitative analysis and establishment of basic theoretical relationships between all processes of hydrology on watershed or other areal basis.

Unit hydrograph principle applied to small water-sheds: discussion. By E. F. Brater. American society of civil engineers. Proceedings. v.66,no.6,pt.1. June, 1940. p.1070-1074.

Insulation.

Insulation economics. By E. J. Rodee. Architectural forum. v.72,no.3. March, 1940. p.161-166. Tells how to estimate combined cost--within limits of accuracy set by factors now used to determine maximum heating load. Besides this important qualification, it should also be emphasized that method ignores both question of summer comfort and cooling cost savings as well as advantages incidental to insulation. With due allowance for these factors, however, it provides good way to prove insulation's main sales point--economy.

Water in refrigeration insulation. By T. T. Tucker and G. A. Robertson. Refrigerating engineering. v.39,no.6. June, 1940. p.364-366. New experiments on an old question use Fiberglas.

Irrigation.

Determining an Index of Supplemental irrigation and its application. By F. E. Staebner. Agricultural engineering. v.21,no.6. June, 1940. p.215-217.

Heavy irrigation is a waste of water. By Floyd E. Brown. Through the leaves. v.28,no.4. July, 1940. p.122-126.

Irrigating rice farms electrically. By E. A. Hodge. Rural electrification exchange. v.3,no.3(New series). 3d quarter, 1940. p.53.

Irrigation of watermelons. By L. D. Doneen and J. H. MacGillivray. Southern Pacific rural press. v.139,no.8. April 20, 1940. p.324.

Perforated drag-type sprinkler lines. By Arthur F. Pillsbury. Southern Pacific rural press. v.139,no.8. April 20, 1940. p.286.

Irrigation. (Cont'd).

Thirty years of supplemental irrigation studies. By W. L. Powers. Agricultural engineering. v.21,no.8. August, 1940. p.311-312. Advantages of supplemental irrigation for free-working, naturally drained subhumid soils are as follows: 1. It controls soil moisture and overcomes drought. 2. It provides green pasture and green feed late in summer. 3. It saves clover stand and makes cutting the first season. 4. It makes double cropping possible, such as late crops after early crops. 5. It aids beneficial bacterial and chemical activities in soil. 6. It improves quality and aids control of crop pests and diseases, especially of vegetables and berries. 7. It increases efficiency of soil moisture during best growing weather. 8. It aids in deep or early fall plowing and intensive cropping. 9. It softens clods and dissolves plant food. 10. If properly planned where feasible, it pays in increased yields, net profits, and productive values.

What irrigation film told you. Through the leaves. v.28,no.4. July, 1940. p.138-144. Digest of Sound motion picture summarizing economical use of water.

Land Utilization.

Digest of outstanding federal and state legislation affecting rural land use. Washington, D.C., 1940. 16p. Mimeographed. U.S. Bureau of Agricultural economics. Land economics. Bulletin no.54.

Digest of outstanding federal and state legislation affecting rural land use. Washington, D.C., 1940. 27p. Mimeographed. U.S. Bureau of agricultural economics. Land economics division. Bulletin no.55.

Lubrication.

How specialty lubricants are made. By D. M. Considine. Chemical and metallurgical engineering. v.47,no.4. April, 1940. p.230-233. In recent years making of lubricants has become more and more chemical manufacturing process instead of refining operation. Specialty lubricants in form of oils and greases with chemicals added are made by The Lubri-Zol Corp., Cleveland, for use in hypoid gears, diesel engines and elsewhere.

Miscellaneous.

Directory of federal statistical agencies; list of the professional, administrative and supervisory personnel of the Federal statistical agencies in Washington. 4th ed. Compiled by Division of statistical standards, Bureau of the budget, Executive office of the President. Washington, D.C., 1940. 250p. Mimeographed.

Miscellaneous. (Cont'd).

Training for aggressive leadership. By K. J. T. Ekblaw. Agricultural engineering. v.21,no.7. July, 1940. p.255-256,263. Developing qualities of leadership. Personality for leadership. Selective growth in knowledge. Exercising choice in experience. Breadth of knowledge and experience. Responsibilities of educational institutions.

Motor Fuel.

Progress toward a standard tractor fuel. Agricultural engineering. v.21,no.3. March, 1940. p.97-98.

Motors, Electric.

Use of portable motor on the farm. By James L. Copeman. Rural electrification exchange. v.3,no.3(New series). 3d quarter, 1940. p.70-71. Cross section diagrams of electric motor driven grindstone.

Pest Control.

Electric light for insect and bacteria control. Agricultural engineering. v.21,no.6. June, 1940. p.218.

Field control of the codling moth by electric and other traps. By G. Edw. Marshall and Truman E. Hienton. Rural electrification exchange. v.3,no.2(New series). 2d quarter, 1940. p.38-39. Major research pursuits of Orleans Station of Purdue University Agricultural Experiment Station since 1928.

Insect and bacteria control with electric light. Agricultural engineering. v.21,no.8. August, 1940. p.306.

Use of electric light traps in the control of the European corn borer. By G. A. Ficht, T. E. Hienton, and J. M. Fore. Agricultural engineering. v.21,no.3. March, 1940. p.87-89.

Pipes and Piping.

Facts and fallacies in heating piping. By T. W. Reynolds. Heating and ventilating. v.37,no.5. May, 1940. p.39-41. Part 2. Piping around beams and doorways; methods of lifting condensate.

Plows and Plowing.

Results of legume coverage studies. By I. F. Reed. Agricultural engineering. v.21,no.4. April, 1940. p.129-130,134. Studies to determine possibilities of covering legume crops with

Plows and Plowing. (Cont'd).

moldboard plows were carried on from 1923 to 1927 by Alabama Agricultural Experiment Station. Results of these studies show value of proper adjustment of plow and certain attachments for getting debris turned.

Variable width plow. By E. V. Collins and C. K. Shedd. Agricultural engineering. v.21,no.8. August, 1940. p.322.

Rainfall and Runoff.

Preliminary analyses of runoff data from the Edwardsville project. By W. W. Horner. Agricultural engineering. v.21,no.6. June, 1940. p.223-226.

Refrigeration.

Successful farm refrigerator fills many uses. By Fred Erbach. Refrigerating engineering. v.39,no.6. June, 1940. p.361-363. Farm refrigerator which fills bill satisfactorily must meet variety of needs, author points out. Most farmers consider ordinary domestic refrigerator too small and too costly, but more important, it is not what they want and need. They need refrigeration which combines domestic refrigerator with facilities for milk cooling, locker storage, cold storage and precooling--in short, combination of commercial and domestic equipment.

Research.

Progress of agricultural research in Ohio, 1937-1938. Wooster, Ohio, 1939. 88p. Ohio agricultural experiment station. Bulletin no.600.

Septic Tanks.

Vacuum cleaner for septic tanks. By Arthur J. Lazenby. Engineering news-record. v.124,no.23. June 6, 1940. p.801-802. Mounted on small truck, engine of which produces vacuum, this cleaning equipment not only expedites work but also eliminates unsanitary features of sludge removal from septic tanks.

Silage.

Study of legume-grass silage on Ohio farms. By F. L. Morison. Columbus, Ohio, 1940. 25p. Mimeographed. Ohio state university. Department of rural economics. Mimeograph bulletin no.127.

Silos.

Durable concrete silo staves. By Philip W. Manson. Agricultural engineering. v.21,no.6. June, 1940. p.229-230,234. Conclusions: High-quality concrete silo staves are durable. Concrete stave of durable aggregates, testing in transverse strength 140 lb per inch of width, having 10-min absorption not in excess of 2.5 per cent, and 48-hr absorption not in excess of 5.5 per cent, should give long, satisfactory service. Many manufacturers are now selling staves of this high quality. Purchase of those of poorer quality is not recommended.

Experiences with portable silos. By J. Hunter-Smith. Journal of the ministry of agriculture. v.46,no.8. March, 1940. p.722-724.

Simple silo. Journal of the Ministry of agriculture. v.46,no.8. March, 1940. p.732. Main feature of this silo is its straw walls. These are built upon rectangular area, size of which is dictated by requirements, but which never rises more than 6 ft. in height. Frame is based on 9-ft. wooden stakes (about 4 x 4 in.) driven 3 ft. into ground at 12-ft. intervals. Horizontal bars are fixed to inside of these stakes at 16-in. intervals, and bales of straw (tied with twine, not wire) are closely placed against these to form low walls inside framework. Bales may also be used to floor silo, but thick layer of chaff is preferable. Angles at corners are smoothed off by setting bales crosswise so that no empty spaces or air pockets will be left in filling process.

Temporary silos. By W. A. Foster. Successful farming. v.38,no.4. April, 1940. p.26,68-69.

Silt.

Silting of reservoirs. By L. Standish Hall. American water works association. Journal. v.32,no.1. January, 1940. p.25-42. Paper is divided into two parts: first, description of results of measurements of silt deposits in various reservoirs owned by East Bay Municipal Utility District with comparison of rates of silting in other reservoirs; and second, outline of proposed methods of controlling rate of erosion on District's watersheds.

Snow Surveying.

How snow surveys are made. By R. L. Parshall. Through the leaves. v.28,no.3. May, 1940. p.87.

Snow surveying. By J. C. Marr. Washington, U.S. Govt.print. off., 1940. 46p. U.S. Department of agriculture. Miscellaneous publication no.380.

Soil Moisture.

Construction, operation, and use of the North Fork infiltrometer. By P. B. Rowe. [Oakland, Calif.] 1940. 64p. California forest and range experiment station. Miscellaneous publication no.1.

Easy way to estimate soil moisture. By George Ellis. California cultivator. v.87,no.3. February 10, 1940. p.59,79.

Electrical methods of measuring soil moisture. By N. E. Edlefsen. Southern Pacific rural press. v.139,no.8. April 20, 1940. p.291.

Electrical resistance method for the continuous measurement of soil moisture under field conditions. By G. J. Bouyoucos and A. H. Mick. East Lansing, Mich., 1940. 38p. Michigan state college. Agricultural experiment station. Technical bulletin no.172.

Relation of the depth to which the soil is wet at seeding time to the yield of spring wheat on the Great Plains. By J. S. Cole and O. R. Mathews. Washington, U.S. Govt.print.off., 1940. 20p. U.S. Department of agriculture. Circular no.563.

Survey and discussion of lysimeters and a bibliography on their construction and performance. By H. Kohnke, F. R. Dreibelbis and J. M. Davidson. Washington, D. C., 1940. 68p. U.S. Department of agriculture. Miscellaneous publication no.372.

Water penetration in irrigated lands. By W. T. McGeorge. Southern Pacific rural press. v.139,no.8. April 20, 1940. p.308-309.

Soil Sterilization.

Belt type continuous soil sterilizer. By L. S. Caple. Rural electrification exchange. v.3,no.2(New series). 2d quarter, 1940. p.44.

Soils.

Liming of soils. By E. C. Shorey. Washington, U.S. Govt. print.off., 1940. 26p. U.S. Department of agriculture. Farmers' bulletin no.1845.

Soil surveys and soil research. By A. Leahey. Canadian society of technical agriculturists. Review. No.23. December, 1939. p.10-13,91.

Solar Cooker.

Solar cooker. By C. G. Abbot. Stove builder. v.5,no.3. March, 1940. p.20-23,40.

Specific Heat.

New specific heats. By Robert C. H. Heck. Mechanical engineering. v.62,no.1. January, 1940. p.9-12. Purpose of paper after outline description of methods and showing of curves, is to present results of research in form of numerical tables.

Spillways.

Design of a high-head siphon spillway. discussion. By Elmer Rock. American society of civil engineers. Proceedings. v.66,no.4,pt.1. April, 1940. p.666-670.

Spillways and energy dissipators. By J. E. Warnock. In Proceedings of Hydraulics conference. Iowa City, Ia., 1940. University of Iowa studies. Studies in engineering. Bulletin no.20. p.142-159.

Storage of Farm Produce.

Design problems for combined crib and granary. By Henry Giese. Agricultural engineering. v.21,no.7. July, 1940. p.283-285.

Steel bin design for farm storage of grain. By R. E. Martin. Agricultural engineering. v.21,no.4. April, 1940. p.144,146. Bin described is particularly suitable for storage of surplus wheat and shelled corn, but for other storage purposes where ventilation and other factors are involved a somewhat more complex structure is necessary to properly meet purpose.

Storage of frozen vegetables. By R. R. Jenkins, D. K. Tressler, J. Moyer and J. McIntosh. Refrigerating engineering. v.39,no.6. June, 1940. p.381-382. Vitamin C experiments.

Stream Pollution.

Ohio River pollution survey's relation to stream pollution problems in West Virginia. By E. S. Tisdale. American water works association. Journal. v.32,no.4. April, 1940. p.545-554.

Protection of watershed for Syracuse supply. By Arnold F. Gregory. American water works association. Journal. v.32,no.4. April, 1940. p.555-569.

Sugar Cane.

Sugar and the Everglades. Clewiston, Fla., United States Sugar corporation, 1939. 55p.

Surveying.

An improved method for adjusting level and traverse surveys: discussion. By Clarence Norris and Julius L. Speert. American society of civil engineers. Proceedings. v.66,no.6,pt.1. June, 1940. p.1085-1088.

Triangulation in New Mexico. [1927 datum] By F. L. Culley. Washington, U.S. Govt.print.off., 1940. 306p. U.S. Coast and geodetic survey. Special publication no.219.

Tanks, Concrete.

Concrete tanks: notes on their construction. By John W. Lewis. Indian engineering. v.107,no.3. March, 1940. p.74-76.

Temperature.

Stable temperatures. By M. A. R. Kelly. Hoard's dairyman. v.85,no.6. March 25, 1940. p.190.

Terracing.

Analysis of degree and length of slope data as applied to terracing. By Austin W. Zingg. Agricultural engineering. v.21,no.3. March, 1940. p.99-101. Summary: Rational equation for soil loss as affected by degree and length of slope is applied to problem of terrace spacing and terrace effectiveness. Theory of terrace spacing is evolved as follows: When terraces of given dimension are placed on given slope, there is length of interterraced spacing which will produce minimum average soil loss per unit area from interterraced area to terrace channel. Theoretical equation for terrace spacing, based on theory presented, is given and compared with present recommendations for specific group of values of factors involved. It is believed that considerable latitude of terrace spacing may be used and produce only small variation in average soil loss per unit area between terraces. Dimensions of terrace are factor to be considered from soil loss viewpoint in terrace spacing recommendations. Theoretical equation is given for determining terrace effectiveness. This is illustrated with specific values assigned to factors involved.

Terrace maintenance. By C. L. Hamilton. Agricultural engineering. v.21,no.8. August, 1940. p.317-318,321.

Tires.

Care of tractor tires. By R. U. Blasingame. Pennsylvania farmer. v.123,no.1. July 13, 1940. p.8.

Change to rubber. By Donald K. Struthers. Nebraska farmer. v.82,no.10. May 18, 1940. p.5,23.

Effect of liquid weight on bouncing of pneumatic tractor tires. By H. W. Delzell. Agricultural engineering. v.21,no.4. April, 1940. p.138,140. Advantages claimed are as follows: 1. Reduces bounce of tractor, improving riding quality on rough ground. 2. Lowers center of gravity. 3. Starting and acceleration is quicker. 4. Less awkward and laborious to handle than iron wheel weights. 5. Iron wheel weights work loose and throw wheels out of balance. 6. More flexibility as to amount of added weight. 7. Eliminates iron weights projecting beyond tires or hubs. 8. More uniform drawbar pull over rough ground.

Farm tire sizes simplified. Agricultural engineering. v.21,no.6. June, 1940. p.236. For several months committee, representing farm tractor and implement industry and tire industry, has been working toward simplification of farm tire sizes. First phase of work of Agricultural Tire Simplification Committee has been completed successfully by reduction from 214 to 128 in number of farm tractor tire sizes required by tractor manufacturers, and from 118 to 73 in number of tire sizes required by implement manufacturers. Official list, which shows sizes approved by joint committee representing two industries and number of units sold last year in each size, is being distributed to all tractor, implement, and tire manufacturers with urgent request that engineers use this list of approved sizes in designing their tractors and implements and in selecting tire sizes for them. By means of this list the engineers will be able to pick those sizes which are already in production and to use, if possible, items that are produced in greatest volume. Committee will continue to meet periodically for twofold purpose for which it was established, namely, (1) to eliminate other existing sizes as need for them disappears, and (2) to discourage introduction of unnecessary new sizes which are not required by bonafide engineering considerations or other reasons.

Field studies with dual tractor tires. By C. W. Smith. Agricultural engineering. v.21,no.7. July, 1940. p.277-280. Paper presents some results of work done to compare dual tractor tires with single tires while using general purpose tractor on lister ridges, on wet stubble ground, and on plowed ground. For all work rear static weight of tractor was kept constant at 4090 lb. This weight included weight of tractor operator, and also weight of burette operator while fuel consumption data were being taken. Tractor was driven in second gear and used tractor fuel. Conclusions: 1. It is difficult to make

Tires. (Cont'd).

single pneumatic tires ride lister ridges. It can be done by throttling tractor and pulling little or nothing. 2. Dual tires of any size, spaced 3-1/2 to 4-1/2 in apart on rim, ride lister ridges satisfactorily. 3. Dual tires gave better traction on wet stubble field than single tires, and can be expected to negotiate wet field spots better than single tires. 4. Dual tires had less travel reduction in plowed ground than single tires. In other words, they slipped less and gave better traction. 5. Dual tires showed higher fuel consumption, in pounds per drawbar-horsepower-hour, than did single tires. Difference was small and tends to discourage idea of lessening fuel consumption and thereby tractor operating costs by use of dual tires. 6. Dual tires may have capacity to carry more added weight than single tires. Traction will increase in proportion to increase in weight on tires, until limited by engine horsepower.

Single versus dual pneumatic tires. By E. C. Sauve. Agricultural engineering. v.21,no.3. March, 1940. p.105-106,109. Summary of all tests comparing 9.00-36 single pneumatics with 5.00-44 dual pneumatics follows: 1. Traction, expressed in pounds pull on tractor drawbar, was greater for single than for dual pneumatics for same per cent slippage for all soils and conditions tested. 2. Advantage in traction gained by single pneumatics over dual pneumatics for slippage of 16 per cent is as follows: Sand, 41.1 per cent; disked ground, 20.4 per cent; freshly plowed ground, 19 per cent; muck (plowed and rolled), 15 per cent; sod, 13.25 per cent; and muck (mint stubble), 11.7 per cent. 3. Increased weight on driving wheels of tractor increased traction for same percentage of slip. 4. At 16 per cent slip, drawbar pull increase with single pneumatics for 544 lb. added to traction members is as follows: Sod, 400 lb; sand (oat stubble), 280 lb; muck (mint stubble), 250 lb; and freshly plowed ground, 280 pounds. 5. At 16 per cent slip drawbar pull increase, with dual pneumatics for 544 lb. added to traction members, is as follows: Sand (oat stubble), 240 lb; muck (mint stubble), 180 lb. 6. Maximum drawbar pull was obtained with average slippage of 45 per cent. 7. Maximum horsepower was obtained with average slippage of 23 per cent. 8. Coefficient of traction, that is, ratio of drawbar pull at 45 per cent slippage to (zero load) weight on drive wheels, is as follows:

Muck (plowed and rolled) singles, 0.38; duals, 0.33
Muck (mint stubble). . . singles, 0.55; duals, 0.50
Silty loam (sod). . . . singles, 0.90; duals, 0.82
Silty loam (freshly plowed)
singles, 0.62; duals, 0.54
Sand (oat stubble). . . .singles, 0.60; duals, 0.49
Silty loam (freshly plowed and
disked). . . . . .singles, 0.71; duals, 0.60

9. Effect of changing spacing of duals from standard setting of 9 in center to center, to 7-in spacing, did not appear to affect tractive ability, for one comparison made.

Tires. (Cont'd).

Tractor and implement tire sizes simplified. Farm implement news. v.61,no.12. June 13, 1940. p.36.

Rolling on rubber. By Arnold Skromme. Iowa agriculturist. v.41,no.2. May, 1940. p.8. Tests reveal that rubber-tired equipment causes less serious ruts under field conditions than do steel-wheeled machines.

Transport wheels for agricultural machines. By Eugene G. McKibben and J. Brownlee Davidson. Agricultural engineering. v.21,no.2. February, 1940. p.57-58. IV. Effect of outside and cross-section diameters on the rolling resistance of pneumatic implement tires.

Tractors.

Care of farm tractors. By R. U. Blasingame. Pennsylvania farmer. v.122,no.13. June 29, 1940. p.458.

'Loading' recorder for tractor engines. Agricultural engineering record. June, 1940. p.29-33. In tractor utilization survey which was being carried out during period immediately prior to outbreak of war, 'Servis' recorders were used to provide, independently of drivers' logbooks, strict record of running times of tractors concerned. Standard Servis recorder consists of pendulum carrying stylus which traces record on waxed-paper chart rotated by clock.

Method of studying soil packing by tractors. By I. F. Reed. Agricultural engineering. v.21,no.7. July, 1940. p.281-282,285. Conclusions: Preliminary data obtained with power-driven soil resistance recorder indicate that all types of traction units pack soil to considerable depth, and that this packing effect is vectored out appreciable distances beyond edge of tread impression. It is indicated also that rubber tires trend to set up more compact layer of soil than that formed by either steel lug equipment or tracks.

Nebraska's tractor tests. By Carlton L. Zink. Western farm life. v.42,no.6. March 15, 1940. p.5,12. Table gives comparison of small farm tractors now on market throughout most of western states.

New device for laying out contour lines. By L. H. Schoenleber. Agricultural engineering. v.21,no.3. March, 1940. p.91-92. It is called a grade meter, is mounted rigidly on tractor in front of operator and indicates on what grade tractor is operating or on what grade off contour it may be operating. It operates mechanically and has proved sensitive and accurate. Grade meter consists of pendulum attached on

Tractors. (Cont'd).

ball-bearing-mounted shaft which is connected to indicator arm through train of gears. Mechanism is so mounted on tractor that pendulum swings parallel with direction of travel. As pendulum swings, it turns shaft and causes indicator arm to move. Indicator moves over scale arranged to show deviations from zero, and thus show plus or minus grade of land so that operator, in laying out contour lines, steers tractor to read zero at all times.

Oxfordshire tractor census. Agricultural engineering record. June, 1940. p.5-7.

Servicing Delco-Remy tractor generators. By William H. Crouse. Farm implement news. v.61,no.12. June 13, 1940. p.22,31.

That pioneer tractor in Iowa. By F. Hal Higgins. Pennsylvania farmer. v.122,no.10. May 18, 1940. p.4,22.
Minnis "steam plow"--description: Machine consists of boiler, engine on each side working on same shaft, quarter apart after manner of railroad locomotives, and usual connections, all resting on two runners, six feet apart and nearly eight feet long, something like sled. These runners glide over rollers, fixed in endless chain tracks. These tracks revolving in an ellipse, and drive wheels move chains and propel machine forward or backward by same motion. Either side may be run independently of other. By this means, when drawing load, it is easily turned or guided. When ready for work its weight is about eight tons. Width of endless chain tracks is one foot, giving contact with ground of about 2,300 square inches, and 'traction' power limited only by weight.

Tractor repair and maintenance. By R. I. Shawl. Farm implement news. v.61,no.9. May 2, 1940. p.24,26.

Tractor repair and maintenance. By R. I. Shawl. Farm implement news. v.61,no.12. June 13, 1940. p.19-20.

Tractor repairs: part 2. By R. I. Shawl. Wisconsin agriculturist and farmer. v.67,no.3. February 10, 1940. p.24,28.

Tractor repairs. By R. I. Shawl. Wisconsin agriculturist and farmer. v.67,no.4. February 24, 1940. p.21,31.
Part 3: Valve sticking.

Tractor repairs: part 5. By R. I. Shawl. Wisconsin agriculturist and farmer. v.67,no.7. April 6, 1940. p.14-15.

Tractor repairs. By R. I. Shawl. Wisconsin agriculturist and farmer. v.67,no.8. April 20, 1940. p.11,23.
Part 6. Fuel system and carburetor.

Tractors. (Cont'd).

Tractor testing scheme; report on test of Bristol tracklaying tractor. London, Royal agricultural society of England, 1940. 4 unnumbered pages.

Tractor testing scheme; report on test of David Brown wheel tractor. London, Royal agricultural society of England, 1940. 4 unnumbered pages.

Tractor testing scheme; report on test of Minneapolis-Moline model RT. pneumatic tyred wheel tractor. London, Royal agricultural society of England, 1940. 4 unnumbered pages.

Tractors and machinery for the 1940 work. By F. W. Duffee. Wisconsin agriculturist and farmer. v.67,no.6. March 23, 1940. p.5,13.

Transportation.

Transportation of agricultural products in the United States, 1920-June 1939: selected list of references relating to the various phases of railway, motor, and water carrier transportation. Part II. Highway, rail, and water transportation. Compiled by E. M. Colvin. Washington, D.C., 1939. 565p. Mimeographed. U.S. Bureau of agricultural economics. Agricultural economics bibliography no.81.

Trucks.

Use of farm trucks in marketing farm products in central Indiana. By T. W. Cowden. Lafayette, Ind., 1939. 37p. Purdue University. Agricultural experiment station. Bulletin no.443.

Ventilation.

Dairy barn ventilation. By M. G. Huber. Orono, Me., 1940. 15p. University of Maine. College of agriculture. Extension service. Extension bulletin 277.

Dairy stable ventilation. By A. M. Goodman. Agricultural engineering. v.21,no.8. August, 1940. p.301-302,309. Floor outtake. Single outtake. Insulation of the outtake flue. Flue top or ventilator head. Size of outlet. Inlets to direct air straight upward. Inlets--size and number. Use of fans in ventilation.

Methods of ventilating wheat in farm storages. By C. F. Kelly. Washington, D.C., 1940. 74p. U.S. Department of agriculture. Circular no.544.

Walls.

Structural properties of "precision-built" frame wall and partition constructions sponsored by the Homasote co. By H. L. Whittemore and A. H. Stang. Washington, U.S. Govt.print.off., 1940. 30p. National bureau of standards. Building materials and structures. Report BMS48.

Structural properties of "Scot-Bilt" prefabricated sheet-steel constructions for walls, floors, and roofs sponsored by the Globe-Wernicke co. By H. L. Whittemore, A. H. Stang, and V. B. Phelan. Washington, U.S. Govt.print.off., 1940. 24p. National bureau of standards. Building materials and structures. Report BMS46.

Structural properties of wood frame wall and partition constructions with "Celotex" insulating boards sponsored by The Celotex corp. By H. L. Whittemore and A. H. Stang. Washington, U.S. Govt. print.off., 1940. 25p.

Wall surface temperatures affect comfort and economy. By F. E. Giesecke. Performance. v.11,no.3. p.1,4.

Water, Underground.

Control of sub-soil water level. By Ram Kishore. Indian engineering. v.107,no.3. March, 1940. p.83-84.

Ground rainfall under vegetative canopy of crops. By J. L. Haynes. American society of agronomy. Journal. v.32,no.3. March, 1940. p.176-184.

Water Rights.

Analysis of legal concepts of subflow and percolating waters: discussion. By Harold Conkling. American society of civil engineers. Proceedings. v.66,no.6,pt.1. June, 1940. p.1130-1132.

New water laws needed in the West. Reclamation era. v.30,no.1. January, 1940. p.18-19.

Water Supply.

Time of concentration of small agricultural watersheds. By Z. P. Kirpich. Civil engineering. v.10,no.6. June, 1940. p.362.

Water supply on Upper Salt River, Arizona: discussion. By George F. McEwen. American society of civil engineers. Proceedings. v.66,no.6,pt.1. June, 1940. p.1117-1118.

Weaving.

Machinery and methods in staple fibre weaving. By A. Palmer. Silk journal and rayon world. v.16,no.190. March, 1940. p.18-20. Wide variations in mill practice suggest need for further studies.

Weeds.

Continuous burning to eradicate noxious weeds. By C. L. Corkins and A. B. Elledge. Reclamation era. v.30,no.5. May, 1940. p.140-142.

Controlling weeds in the pasture. By L. R. Neel. Southern agriculturist. v.70,no.4. April, 1940. p.5.

Danger: weeds ahead. By Raymond Currier. Iowa agriculturist. v.40,no.9. April, 1940. p.4. Danger in destructive noxious weeds lying hidden in crop seed supplies cautions farmers to observe protective measures.

Equipment for chemical weed control. By O. C. French. Southern Pacific rural press. v.139,no.6. March 23, 1940. p.222.

Farm losses from weeds greater than all other pests. By R. J. Evans. Utah farmer. v.59,no.22. June 25, 1940. p.6. Recommendations for 1940 weed program: 1. That sodium chlorate or atlacide be used on ditch banks, non-movable fence lines, or clay or gravelly lands which cannot be cultivated, and on roadways. 2. That carbon bisulfide be used only on small patches which occur on better farm lands. 3. That clean cultivation be rule on all cultivatable land accessible to such methods. 4. Three year contracts should be signed with land owners who come into program.

Field bindweed--worse than a mortgage. By George F. Jordan. Missouri farmer. v.32,no.9. May 1, 1940. p.3-5.

Kansas gains ground in battle against weeds. By Roy Freeland. Kansas farmer. v.77,no.6. March 23, 1940. p.3,20.

Sprayers for weeds in grain fields. By O. C. French. Pacific rural press. v.139,no.4. February 24, 1940. p.123.

Summary of bindweed situation and progress of eradication in 1939; report of the Kansas State board of agriculture, June 1940. Topeka, Kansas, 1940. 74p.

Weed and fungus control with carbon bisulfide. By Orval C. French. Implement record. v.37,no.3. March, 1940. p.11,38.